

ORIGINAL ARTICLE

Factors Affecting Hospital Employees' Knowledge Sharing Intention and Behavior, and Innovation Behavior

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Abstract

Objectives: To investigate the factors affecting employees' knowledge sharing intention, knowledge sharing behavior, and innovation behavior of the four top-ranked university hospitals in South Korea.

Methods: Data were collected from employees at three university hospitals in Seoul, Korea and one university hospital in Gyeonggi-Do, Korea through self-administered questionnaires. The survey was conducted from May 29, 2013 to July 17, 2013. A total of 779 questionnaires were analyzed by SPSS version 18.0 and AMOS version 18.0.

Results: Factors affecting hospital employees' knowledge sharing intention, knowledge sharing behavior, and innovation behavior are reciprocity, behavioral control, and trust.

Conclusion: It is important to select employees who have a propensity for innovation and continuously educate them about knowledge management based on trust.

1. Introduction

In our knowledge-information society, organizations regard knowledge as a core resource to identify their competitiveness. Furthermore, organizations try to create added value through sustainable knowledge sharing and innovation.

Recently, the opening of the medical market, the development of medical technology and information, and the introduction of new high-tech medical

equipment has intensified competition in both the domestic and international medical markets. Dalkir [1] pointed out that the more uncertain and dynamic the environment is, the more important innovation becomes. Therefore, innovation behavior is a key factor in the survival and growth of hospital organizations in the long run. The public health and health care fields are well positioned to leverage knowledge throughout the world [1]. Organizations that differentiate their processes or products and services have been shown regularly to

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outperform their competitors in terms of profitability, market share, and growth [2]. Hospital organizations can promote knowledge sharing culture, not only by directly incorporating knowledge in their business strategy, but also by changing employees' attitudes and behavior by promoting consistent knowledge sharing [3]. Hospital organizations attempt to set up knowledge management to implement their knowledge more effectively. In particular, knowledge sharing in hospital organizations is for the management of intellectual resources and employee's hospital work styles by providing new ideas, tools, services and processes, which results in innovative behavior in the organization.

Beginning in industrialized nations in the 1990s, knowledge management began by considering knowledge as the intellectual assets of organization. Recently, it has been adopted as the main management technique or strategy within certain companies. Knowledge management is the process of attaining intellectual and social capital. This process will lead to core competencies and higher levels of organizational performance unique to the organization [4]. In particular, hospital organizations realize that knowledge management can help them to use their current competencies or develop new and innovative ideas, services, products, processes, and solutions. Hospital organizations should take knowledge management in order to enhance knowledge creation, knowledge sharing, and application. In this way, effective knowledge management will turn hospitals into fast-learning organizations with sustained and competitive advantages [5]. The Mayo Clinic established an Innovation Center to identify and share examples of innovative patient-centered services in 2008. It is now regarded as a global innovator in medical services. Lee and Choi [6] stressed that hospitals in South Korea ask for innovation behavior from their employees. To do this, hospital organizations must build and develop knowledge by stimulating the

employees' knowledge sharing and continually fostering innovation in their organizations. However, culture and systems of hospital organizations have not been set up for successful knowledge management.

One of the reasons is that hospital organizations consist of professional groups such as medical specialists, nursing specialists, clinical technicians, and administrative staff who have differing roles and skills. Therefore, the different departments within a hospital organization need to obtain new knowledge and various techniques to encourage employees in several ways. Moreover, unlike other organizations, hospital organizations are the most complex organizations in our society. They have a lot of information, skills, knowledge, and complicated decision-making processes and networks. This causes hospital organizations to require the rapid, accurate, systematic and long-term sharing of technology, information and knowledge. Furthermore, those systems also require immediate feedback mechanisms [7].

Overall, in order to have successful knowledge sharing, hospital organizations need to understand organizational factors such as systems, organizational structure, and organizational culture. Also, it is necessary to identify individual factors such as the characteristics of the employee's knowledge sharing intention and behavior. However, the studies about the relationships between knowledge sharing and innovation behavior are still rare in the medical field.

The purpose of this study was to provide a better understanding of the phenomenon. The focus was to test whether employees' knowledge sharing influences innovation behavior through the knowledge sharing process. We investigated how employees' knowledge sharing affected knowledge sharing behavior and innovation behavior. A further purpose of this study was to investigate the effect of individual factors (incentives, reciprocity, subjective norms, and behavioral control)

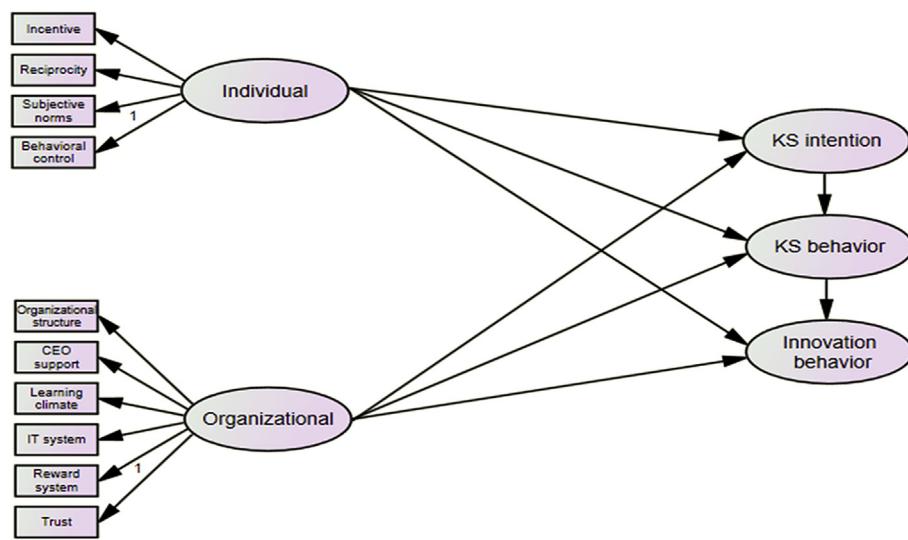


Figure 1. Research model.

Table 1. Survey instrument.

Classification			Definition	Sources
Independent	Individual	Incentives	Perception to obtain a better work assignment, promotion, and many education chances	Kankanhalli et al [8], Bock et al [9]
		Reciprocity	Perception to respond for my knowledge needs, the emergency situation, and mutual intimacies	Kankanhalli et al [8], Wasko and Faraj [10]
	Subject norms		Social pressure which CEO, boss, and colleagues should share knowledge with my colleagues	Bock et al [9]
		Behavioral control	Perception and ability to share knowledge with my colleagues by myself	Kankanhalli et al [8], Wasko and Faraj [10]
Organization	Organizational structure		Ability of the structure such as delegation of authority for decision-making, systematic methods and procedures	Chandler et al [11], Lin [12]
		CEO support	CEO's strong will, environment aid, and physical support for knowledge sharing	Hsu [13], Tan and Zhao [14]
	Learning climate		Regular training and programs about new knowledge	Lee and Choi [6], Yeh et al [15]
		IT systems	Efficiently building, management, and use of IT system	Bock et al [9], Kankanhalli et al [8]
	Rewards systems		Extrinsic and intrinsic incentives, fairness about rewards	Ross and Weiland [16]
		Trust	Interaction openly among colleagues about hospital policy, colleagues' knowledge and experience	Bock et al [9]
Dependent	Knowledge sharing intention		Motivation about actual knowledge, formal document, know-how, and expert knowledge	Bock et al [9]
		Knowledge sharing behavior	Action to share knowledge and actually use knowledge	Bock et al [9]
	Innovation behavior		Action to create new and innovative ideas, technical tool and method	Scott and Bruce [17]

and organization factors [organizational structure, chief executive officer (CEO) support, learning climate, information technology systems, rewards systems, and trust] relevant to knowledge sharing or innovation behavior through knowledge sharing intention and knowledge sharing behavior.

2. Materials and methods

2.1. Data collection

Hospitals mainly focus on medical and administrative areas, thus, it is difficult to answer knowledge sharing and innovation questions. Therefore, this survey only focused on large hospitals that have a vision and mission about hospital management, medical care, research and development, education, hospital culture and systems, and employees' mind for "Medical Innovation", and "Administration Innovation" strategy.

The sample of employees included nurses, administrative staff, and medical technicians who were randomly selected from the top four university hospitals in Seoul, Korea and Gyeonggi-Do, Korea. The survey was conducted from May 29, 2013 to July 17, 2013. Of the 820 questionnaires distributed, 779 were completed and usable questionnaires were returned, representing a response rate of 95%.

2.2. Research model

The research model is illustrated in Figure 1.

2.3. Measurement of variables

There were two groups of factors related to knowledge sharing: individual factors (incentives, reciprocity, subjective norms, and behavioral control) and organizational factors (organizational structure, CEO support, learning climate, information technology systems, rewards systems, and trust). The factors connected to knowledge sharing performance are employees' knowledge sharing intention, knowledge sharing behavior, and innovation behavior. The operational definition and sources of constructs in the model are described in Table 1.

The questionnaires were divided into demographic characteristics, including the individual and organization factors of knowledge sharing, sharing intention, knowledge sharing behavior, and innovation behavior. The items were measured using a seven-point Likert-type scale (ranging from 1 = strongly disagree to 7 = strongly agree). In the questionnaires, negative items were set up to inhibit insincere answers and then normalized. A score closer to 7 was interpreted as positive, whereas a score closer to 1 was negative.

To measure the variables, we used a multiple-item scale derived from existing studies. Table 2 shows the reliability of the scale questions that can be used using Cronbach's α to measure internal coincidence. All

Table 2. Results of reliability coefficients.

Classification		Items	Cronbach's α
Individual	Incentive	3	0.834
	Reciprocity	3	0.889
	Subjective norms	3	0.829
	Behavioral control	3	0.801
Organizational	Organizational structure	3	0.602
	CEO support	3	0.897
	Learning climate	3	0.876
	IT systems	3	0.900
	Rewards system	3	0.903
	Trust	3	0.907
Dependent	KS intention	4	0.931
	KS behavior	4	0.885
	Innovation behavior	4	0.948

CEO = chief executive officer; IT = information technology; KS = knowledge sharing.

variables except organizational structure (0.602) ranged from 0.801 to 0.948, exceeding the recommended value of >0.80 .

2.4. Statistical analysis

The data were analyzed using Structural Equation Modeling in SPSS version 18.0 (SPSS Inc., Chicago, IL, USA) to validate the research model. We conducted frequency analysis to measure the demographic characteristics. We used the *t* test and analysis of variance to compare mean differences for sharing intention, knowledge sharing behavior, and innovation behavior according to the demographic characteristics. Finally,

Table 3. Respondent characteristics.

Classification		Frequency	%
Sex	Female	499	64.1
	Male	280	35.9
Age (y)	20–29	130	16.7
	30–39	354	45.4
	≥ 40	295	37.9
Education level	High school	15	1.9
	University	600	77.0
	Graduate school	164	21.1
Work experience (y)	≤ 5	176	22.6
	6–10	274	35.2
	11–15	126	16.2
	≥ 16	203	26.0
Occupation type	Nursing staff	244	31.3
	Technical staff	261	33.5
	Administrative staff	274	35.2
Position	General employee	340	43.6
	Junior manager	232	29.8
	Middle manager	207	26.6
Total		779	100.0

Table 4. Mean difference of KS intention, KS behavior, innovation behavior by sociodemographic characteristics.

Classification		Level of KS		Level of KS		Level of IB	F-test/t-test
		Intention	F-test/t-test	Behavior	F-test/t-test		
Sex	Female	5.42 ± 0.91	-2.98**	4.93 ± 0.84	-2.02	4.48 ± 1.00	-7.22***
	Male	5.62 ± 0.89		5.06 ± 0.89		5.01 ± 0.96	
Age (y)	20–29	5.43 ± 0.93	11.17***	4.82 ± 0.84	14.21***	4.27 ± 0.96	27.41***
	30–39	5.36 ± 0.91		4.86 ± 0.85		4.56 ± 1.00	
Education level	≥40	5.69 ± 0.86		5.18 ± 0.85		4.98 ± 0.98	
	High school	5.05 ± 0.95	4.79**	4.92 ± 0.74	2.14	4.48 ± 0.68	7.21**
	University	5.46 ± 0.92		4.95 ± 0.87		4.60 ± 1.03	
Work experience (y)	Graduate school	5.65 ± 0.84		5.10 ± 0.84		4.93 ± 0.97	
	≤5	5.50 ± 0.93	3.86**	4.89 ± 0.87	2.33	4.43 ± 1.05	6.40***
	6–10	5.38 ± 0.88		4.94 ± 0.82		4.67 ± 0.98	
	11–15	5.46 ± 0.91		4.99 ± 0.81		4.68 ± 0.94	
Occupation type	≥16	5.66 ± 0.91		5.10 ± 0.93		4.88 ± 1.04	
	Nursing staff	5.53 ± 0.90	0.42	4.97 ± 0.88	0.20	4.57 ± 1.07	1.74
Position	Technical staff	5.50 ± 0.93		5.00 ± 0.88		4.72 ± 1.00	
	Administrative staff	5.46 ± 0.90		4.96 ± 0.82		4.71 ± 0.98	
	Employee	5.41 ± 0.93	11.49***	4.87 ± 0.85	17.15***	4.47 ± 0.99	26.49***
	Junior manager	5.39 ± 0.89		4.88 ± 0.89		4.59 ± 0.99	
	Middle manager	5.75 ± 0.84		5.27 ± 0.87		5.09 ± 0.98	

IB = innovation behavior; KS = knowledge sharing. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

we used confirmatory analysis and completed maximum likelihood estimation using Analysis of Moment Structure (AMOS) in SPSS version 18.0 (SPSS Inc., Chicago, IL, USA). Fit indices indicated χ^2 , Normal Fit Index (NFI), Tucker–Lewis Index (TLI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). To improve the fit of the model, modification indices were used.

3. Results

3.1. Sociodemographic characteristics

The respondents' characteristics are shown in Table 3. Among the 779 respondents, 499 (64.1%) were female and 280 (35.9%) were male. Three hundred and fifty-four (45.4%) participants were aged 30–39 years, 295 (37.9%) participants were >40 years, and 130 (16.7%) participants were 20–29 years. There were 600 (77.0%) respondents who had graduated from university, 164 (21.1%) respondents had masters degrees, and 15 (1.9%) employees only graduated from high school. In terms of work experience, 274 (35.2%) respondents

had worked in the organization for 6–10 years, 203 (26.0%) respondents had worked for >16 years, 176 (22.6%) respondents had worked for ≤ 5 years, and 126 (16.2%) had worked for 11–15 years. With regard to job type, 274 (35.2%) respondents were administrative staff, 261 (33.5%) participants were medical technicians, and 244 (31.3%) participants were nurses. The positions were grouped into three categories. That is, 340 (43.6%) people were classed as general employees, 232 (29.8%) people as junior managers, and 207 (26.6%) people as middle managers.

3.2. Knowledge sharing intention, knowledge sharing behavior, and innovation behavior according to sociodemographic characteristics

According to sociodemographic characteristics, knowledge sharing intention, knowledge sharing behavior, and innovation behavior of men seemed to be stronger than those of women. The higher the respondents' education level, the stronger their knowledge sharing intention became. As workers' age, education

Table 5. Evaluation of fit measurement: research model.

	χ^2	d.f.	NFI	TLI	CFI	RMSEA
Null model	4757.927	787	0.815	0.826	0.841	0.081
Research model	2101.702	762	0.918	0.939	0.946	0.048
Recommended value	—		>0.9	>0.9	>0.9	<0.08

CFI = Comparative Fit Index; d.f. = degrees of freedom; NFI = Normal Fit Index; RMSEA = Root Mean Square Error of Approximation; TLI = Tucker–Lewis Index.

Table 6. Path result of research model.

Paths	Standardized path coefficient	p
Incentives → knowledge sharing intention	-0.013	
Reciprocity → knowledge sharing intention	0.174	***
Subject norms → knowledge sharing intention	0.164	***
Behavioral control → knowledge sharing intention	0.288	***
Organization structure → knowledge sharing intention	-0.036	
CEO support → knowledge sharing intention	0.048	
Learning climate → knowledge sharing intention	0.069	
IT systems → knowledge sharing intention	0.008	
Rewards systems → knowledge sharing intention	-0.029	
Trust → knowledge sharing intention	0.288	***
Incentives → knowledge sharing behavior	0.066	
Reciprocity → knowledge sharing behavior	-0.123	*
Subject norms → knowledge sharing behavior	0.028	
Behavioral control → knowledge sharing behavior	0.404	***
Organization structure → knowledge sharing behavior	0.010	
CEO support → knowledge sharing behavior	0.118	*
Learning climate → knowledge sharing behavior	0.012	
IT systems → knowledge sharing behavior	0.146	*
Rewards systems → knowledge sharing behavior	-0.027	
Trust → knowledge sharing behavior	0.110	*

Table 6 (Continued)

Paths	Standardized path coefficient	p
Incentives → innovation behavior	0.060	
Reciprocity → innovation behavior	-0.113	*
Subject norms → innovation behavior	-0.015	
Behavioral control → innovation behavior	0.248	***
Organization structure → innovation behavior	0.054	*
CEO support → innovation behavior	0.156	**
Learning climate → innovation behavior	-0.071	
IT systems → innovation behavior	0.032	
Rewards systems → innovation behavior	0.017	
Trust → innovation behavior	-0.125	**
Knowledge sharing intention → KS behavior	0.275	***
Knowledge sharing behavior → innovation behavior	0.557	***

*p < 0.05. **p < 0.01. ***p < 0.001.

level, position, and work experience increased, innovation behavior tended to be higher. Respondents who were older and had a higher position had greater knowledge sharing behavior (Table 4).

3.3. Results of research model

The research model investigated whether the individual and organizational factors influenced innovation behavior through knowledge sharing intention and knowledge sharing behavior.

Based on Table 5, the final research model (RMSEA = 0.048) is better than the null model (RMSEA = 0.081).

As shown in Table 6, the individual and organizational factors influenced knowledge sharing intention. Individual factors (reciprocity, subjective norms, and behavioral control) and an organizational factor, trust, had a significant effect of knowledge sharing intention. Next, individual factors [behavioral control, reciprocity(-)] and organizational factors (CEO support, IT systems, and trust) significantly influenced knowledge sharing behavior. Moreover, individual factors [behavioral control and reciprocity(-)] and organizational factors [organization structure, CEO support, and trust(-)] significantly influenced innovation behavior.

However, reciprocity and trust in particular had a negative influence on innovation behavior.

4. Discussion

The main findings of this study were as follows. First, according to mean differences in knowledge sharing intention, knowledge sharing behavior, and innovation by sociodemographic characteristics, knowledge sharing intention, knowledge sharing behavior, and innovation in men seems to be stronger than in women. The higher the education level, the stronger knowledge sharing intention becomes. As workers' education level, position, and work experience increase, innovation behavior also tends to be higher. The older and higher position one achieves, the better knowledge sharing behavior becomes. Based on these results, a hospital organization should suggest systematic solutions. Therefore, the efficient knowledge management is based on understanding sociodemographic characteristics, in particular age, sex, and cultural and educational differences. Second, this study examined the factors affecting hospital employees' knowledge sharing intention, knowledge sharing behavior, and innovation behavior. Three individual factors (reciprocity, subjective norms, and behavioral control) and one organizational factor (trust) significantly influenced knowledge sharing intention. Two individual factors [reciprocity(−), and behavioral control] and three organizational factors (CEO support, IT system, and trust) had a significant influence on knowledge sharing behavior. Two individual factors [behavioral control and reciprocity(−)] and three organizational factors (organizational structure, CEO support, and trust(−)) significantly influenced innovation behavior through knowledge sharing intention and knowledge sharing behavior. However, two factors (reciprocity and trust) in particular had a negative influence on innovation behavior. Individual factors [behavioral control and reciprocity(−)] and organizational factors (organizational structure, CEO support, and trust(−)) significantly influenced innovation behavior. However, reciprocity and trust had a negative influence on innovation behavior.

According to the findings above, important factors relevant to hospital employees' knowledge sharing behavior and innovation behavior are reciprocity, behavioral control, and trust. Finally, hospital managers should analyze individual factors and organizational factors to enhance workers' knowledge sharing behavior and innovation behavior. Hospital managers should build an organizational culture and system and develop practical strategies. In addition, it is important to select workers who have a propensity for innovation and continuously educate them about knowledge management based on trust.

In the case of trust, an organization maintains rapport through reciprocity and mutual trust among members in the innovation process. Furthermore, organizations need to actively encourage innovative behavior through social interaction among their members [18]. However, our results indicate that mutual trust and reciprocity have a negative impact on innovation behavior. According to Aziz et al [19], because workers perceive their expertise, skill and knowledge and new ideas as sources of power, workers are reluctant to share and create their knowledge. That could be the reason knowledge sharing behavior and innovation behavior are hindered. Thus, in order to achieve knowledge sharing and innovation behavior, hospitals need to set targets and goals, and workers should be instructed and encouraged to share their expertise and innovation with their counterparts.

Krogh et al [20] indicated that some other barriers include organizational structural barriers such as authority and status hierarchies. There are factors that affect knowledge sharing and innovation in organizations, such as lack of time to share knowledge and innovation, concern about job security, lack of awareness, inadequate evaluation and communication of previous mistakes that may improve the individual and organizational learning influences, differences in experience level, lack of interaction, social network, poor communications and interpersonal skills, sociodemographic characteristics (age, sex, and cultural and educational differences), and little trust in the accuracy and credibility of knowledge.

Therefore, Kim and Kim [21] have emphasized that the ultimate goal of knowledge management for innovation and creativity through knowledge sharing is that hospitals need diversity and autonomy of members or departments, decentralization and leadership for rapid responses, internal and external networks to share and exchange information and knowledge, open communication for exchanging high-quality information and face-to-face contact, cohesion for communication and teamwork, and surplus resources for challenges and opportunities.

Consequently, hospitals should employ and educate new employees who have innovative tendencies. Also, hospitals need to recognize that the diversity in an organization is good and to educate experts in various occupations for innovation and creativity, by organizing task force teams. In addition, hospitals should try to build inter- and intra-departmental mutually reciprocal trust, and use innovation behavior to seek work-related changes.

The limitations and suggestions for future research are as follows. First, only four university hospitals were investigated. Hence, in order to compensate for this limitation, research should be conducted using samples from other hospitals, because cultural differences among hospital organizations influence employees' perception regarding knowledge sharing and innovation. Second, this study focused only on nurses, medical technicians,

and administrative staff. So, it does not represent the entire hospital. Future research should consider a broader sample of workers such as CEOs, doctors, and medical personnel. Also, further study can examine how individual traits and organizational characteristics may moderate the relationship between knowledge receivers and providers based on trust. Finally, these data were based on subjective responses and used a cross-sectional approach. Therefore, future studies should gather longitudinal data to examine the causality and inter-relationships between variables that are important to knowledge sharing. In addition, further research considering these factors could enhance our understanding of critical determinants for knowledge sharing and innovation.

Conflicts of interest

The authors declare no conflicts of interest.

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